

The science behind human behaviour psychology essay



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Memory is described as the process of encoding, storing and retrieving information in the human memory system. The Working Memory is one of the four different types of memories that exist in the human memory system. The four types of memories in the human memory system are sensory memory short term memory, Working memory and long term memory (Martin, et al., 2010). On this essay I will be concentrating on the Working Memory, its components, its functions and its strengths and weaknesses.

Baddeley and Hitch (1974) describes the Working Memory to having the capability of storing and manipulating information in the mind for short periods of time. The Working Memory was proposed by Alan Baddeley and Graham Hitch in the 1970`s. They regarded the working memory as having four components which permits us provisionally store verbal and visuospatial materials and coordinates the storage of the material. The components of the working memory are; 1st central executive- (It acts like the boss of the working memory as it controls attention, allocates data to the subsystems i. e. phonological loop and visuo-spatial sketchpad and deals with cognitive tasks such as mental arithmetic and problem solving.) , 2nd Phonological Loop - (storage for verbal information and written materials), 3rd Visuo-spatial Sketchpad - (storage for visual & spatial information) and 4th Episodic Buffer (combines information from subsidiary system with the information from long term memory) (Baddeley and Hitch , 1974).

The Central Executive is the most important component of the model, although little is known about how it functions (McLeod, 2008). Baddeley argues that the Central Executive operates more like a system which

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controls attentional processes rather than as a memory store unlike the phonological loop and the visuo-spatial sketchpad, which are focused on memory storage. When dealing with two activities at the same time, Central Executive prioritises which memory to pay attention to than the other (Mcleod, 2008). For example when driving a car and talking on the phone at the same time, and suddenly a deer pops out of the woods, you will stop talking and concentrate on stopping the car to avoid hitting the deer. That is an example of the Central Executive giving priority to particular activities. The Central Executive is the key component of the multi-component working memory model (Baddeley, 2000, 2007; Baddeley & Hitch, 1974). It controls the allocation of resources within the working memory system by focusing, dividing and switching attention as necessary (Henry, 2011). The central executive has no storage capacity unlike the other two subsystems i. e. the phonological loop and the Visuo-Spatial Sketchpad.

The phonological loop component is recommended as the expert storage system for speech-based and audio information. It is described as a 'slave' system as it does not have any competence in controlling attention or decision-making (Henry, 2011). According to neuroimaging evidence (Jonides et al., 1998), the phonological loop is divided into two further subcomponents, both believed to be positioned in the left hemisphere of the brain; The first subcomponent is the Phonological store - (allows information to acoustically coded items to be sorted for one and a half to two seconds) and the second subcomponent is the Articulatory control process - (allows sub-vocal repetition of items stored in the phonological store).

Most of the information we process is non verbal. We can look at objects then close our eyes yet we can still visualize the objects through describing them or sketching them. The Visuo-Spatial Sketchpad (VSS) contains visual information either obtained from the immediate environment or by the sense organs or retrieved from the long term memory (Martin, et al., 2010). An experiment conducted by Shepard and Metzler (1971) suggested the ability to manipulate visual information by presenting people with pairs of drawings that could have been perceived as three-dimensional constructions made of cubes. The participants task was to identify whether the Shape on the right was identical to the shape on the left; initially some were identical and others were not. Their findings were that the participants were accurate in judging whether the pairs of the shapes were the same or different, but it took longer to decide when rotation was involved on the right hand shape. The data supported what the participants said, which was the more the shape was rotated; the longer it took the participants to rotate the image of one of the shapes in the working memory and compare it with the other one (Martin, et al., 2010). The Visuo-Spatial Sketchpad has a limited capacity and duration of storing information. Its main responsibility is to carry out tasks that demonstrate our ability to manage visual and spatial material, such as Mental Rotation Task (Shepard and Metzler, 1971) and Corsi Block Task (Milner, 1971).

The Episodic Buffer (EB) was added to the working memory model in 2000 by Baddeley. The Episodic Buffer has a limited capacity and entirely depends on the executive processing. The Episodic Buffer combines information from

other subsidiary systems together with the long term memory and produce scenarios (Baddeley, 2000).

In conclusion, the Working Memory is important for cognitive functions such as reading comprehension, academic ability and mathematics (Ashcraft and Kirk, 2001). Performance on a working memory span task involving numbers, for example is a good example of predictor of spatial task performance(Kane et al., 2001). The working memory performs tasks such as verbal reasoning, reading problem solving and visual and spatial processing all of by which are supported by experimental evidence (McLeod, 2008). Experiments which support the working memory model include the Dual Task Studies (Baddeley and Hitch 1974). There are weaknesses associated with the working memory model including criticism against the Visuo-Spatial Sketchpad which implies that all spatial information was first visual, pointing out that blind people have excellent spatial awareness although they have never received any visual information (Baddeley and Lieberman, 1980). The Visuo-Spatial Sketchpad should be divided into two separate components; one for visual information and another for spatial (Baddeley and Lieberman, 1980).